ESSP Step 2 Proposals From a Cost Perspective

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Why Worry About Cost?

NASA needs to be able to make independent assessments of the Cost Risk and the Cost Realism of each project to lessen the chance of mission failure. Some consequences of inadequate assessments are:

- **Cancellation**
- **De-scope of Instrumentation**
- **Loss of spacecraft/instrument**
- **Loss of resolution**
- **Reduced operational period**

The earlier the independent assessment is made, the more taxpayer dollars may be saved.

How Is NASA Costing The Proposals?

Using the technical information requested in Tables K-4a, K-5a, K-6a, K-7, K-8a, and K-9, plus any other data made available, we will parametrically model the proposed mission. The K-x tables may be expanded as necessary to provide information deemed appropriate. The parametrically modeled costs will be used as a part of the Step Two evaluation process (Mission Implementation Criteria) to determine overall risk of the proposed mission to be within budget, on schedule, and with adequate technical and scientific content.

First Step for a Prospective PI:

READ THE NRA/AO/RFP, COVER TO COVER!!!

Read the Technical, Management, Cost, Education & Public Outreach, and Proposal Submittal sections with as much attention to detail as you place on the Science Section

The biggest risk to the PI at this stage is that the proposal will not be selected. Some suggestions to prevent rejection:

- **Provide ALL requested data**
  - **Look for"show", "list", "provide", "explain", "describe", etc.**
  - **Make liberal use of a highlighter**
  - **Create a compliance matrix, include it with the proposal**
- **Get a good Project Manager and Systems Engineer right away - they're experts in what needs to be done**
- **Pay attention to proposal submittal instructions**

Examples (Continued)

From IIP NRA:

(iv) Use of NA SA funds--NASA funding may not be used for foreign research efforts at any level, whether as a collaborator or a subcontract. The direct purchase of supplies

From ESSP AO-3:

complete mission. Teaming and partnership arrange ments are encouraged. Co-Inves tigators (CoI) **shall** have an identified role in the proposal, play a defined and necessary role in the inve stigation, and be cove red in the funding plan. Teams are encouraged to use U.S. commercial

Indicate funding for PI and each Co-I in a small table, similar to this, along with the individual's responsibility in the proposed project.

Name	Position	Institution	Funding	Responsibility
John Doe	PI	JPL	Yes	PI; management of total program
Sharon Smith	Co-I	UCLA	Yes	Radiometer design
Jan Roe	Co-I	UWales	Contrib by UWales	Science Algrorithm development
Pete Jones	Collaborator	USAF	Contrib by USAF	Flight operations
etc.				

- MATERIALS - Supporting detail for major vendors (exceeding $500,000) in phases Mission Definition and Preliminary Design through Mission Operations and Data Analysis, Archival, and Dissemination shall include WBS element, fiscal year or quarter, description, vendor name/address, quantity, and current/proposed unit prices. Material burden rates shall be documented for phases Mission Definition and Preliminary Design through Mission Operations and Data Analysis, Archival, and Dissemination.

Why All This Detail?

Risk Reduction. Cost details tell the reviewer you understand the problem, you've covered all the costs, and your costs are reasonable.

Archival, and Dissemination.

- GENERAL AND ADMINISTRATIVE (G&A) EXPENSE - G&A expense represents the institution's general and executive offices and other miscellaneous expenses related to business. G&A expense shall be itemized by cost pool for the Mission Definition and Preliminary Design phase and summarized as totals for phases Mission Detailed Design through Mission Operations and Data Analysis, Archival and Dissemination. Rates shall be documented for phases Mission Definition and Preliminary Design through Mission Operations and Data Analysis, Archival, and Dissemination.

What is a "Basis Of Estimate"?

Basis Of Estimate: How you determined what the cost will be.

- **Catalog price**
- **Vendor quote**
- **http://www.policyworks.gov/org/main/mt/homepage/mtt/perdiem/travel.shtml**
- **Vendor ROM (or NTE) quote**
- **Parametric estimate**
- **Detailed breakdown of time and materials to build it**
- **Similar to one built on another program last year (analogy)**
- **"Engineering judgement" (SWAG)**

Every cost in the proposal should have a Basis of Estimate!

What If Part Of Our Estimate Is Parametric?

If you've used parametric cost models to develop a part of your estimate, or to confirm the total cost, provide

- **Name of cost model used**
- **Detailed list of items included in the estimate**
- **Input parameters**
- **Sensitivity of point estimate to changes in input parameters**

Explain why you believe this is the most credible estimate

Definition: Risk Management (7120.5A)

"An Organized, Systematic Decision-Making Process That Efficiently Identifies Risks, Assesses or Analyzes Risks, and Effectively Reduces Or Eliminates Risks to Achieving the Program Goals."

Step 1: Admit there are risks…

Step 2:

- **Identify** what can go wrong
- **Analyze and Assess** consequences
- **Mitigate** the impacts; develop plan to prevent
- **Track** progress
- **Update Continuously**

http://www.hq.nasa.gov/office/codeq/risk/risk.htm

What Can Be Done To Lower Risk?

Provide requested data. Information can reduce uncertainty.

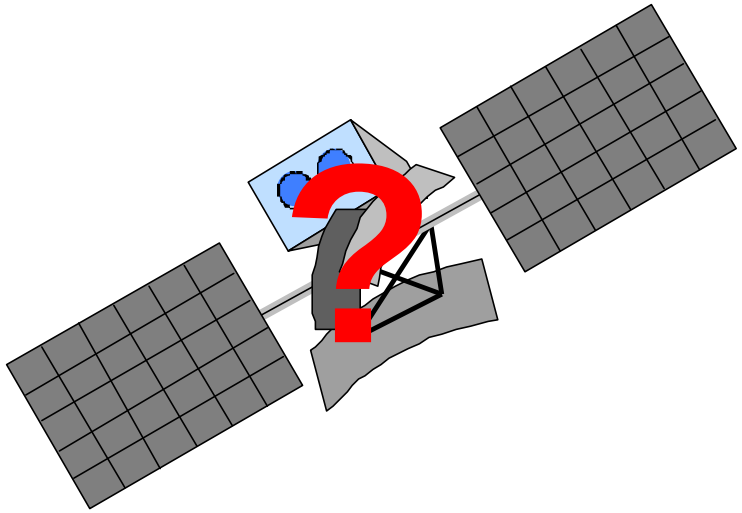
Plan adequate margins and contingencies

- **Mass**
- **Power**
- **Data Transfer Rate**
- **Data Storage**
- **Funding Reserves**
- **Schedule Reserves (funded)**

Anticipate adversity

Plan (and use) Peer Reviews

Descope Plan



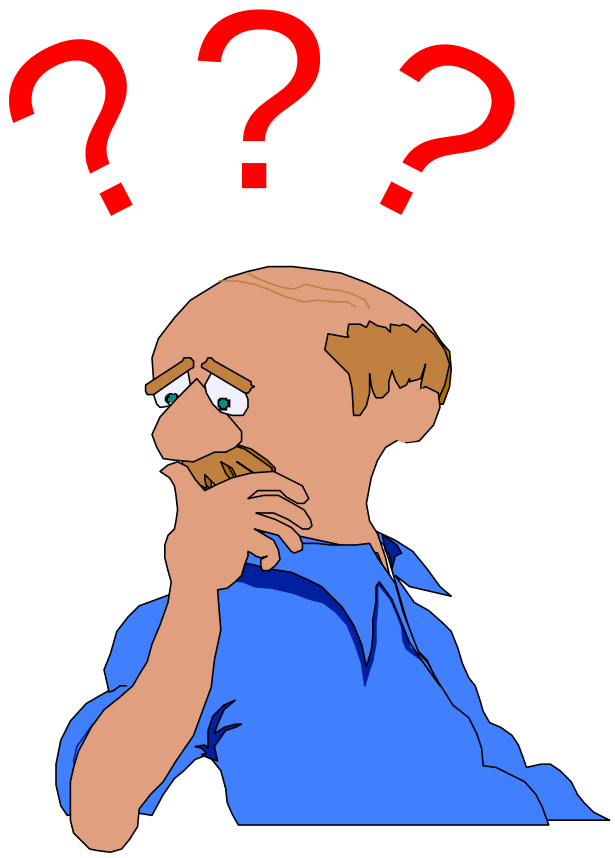
Descope Plan

A plan to reduce or descope the mission to remain within cost and schedule constraints.

- **Establish a "minimum science mission baseline"**
- **Determine what elements can be reduced without impacting minimum science. Discuss risk of having to descope and the plans to mitigate affects on science and mission.**
- **Choose realistic descope options**
- **Determine implementation date**
- **Estimate cost savings**

How Is Cost Risk Reduced?

- Adequate Information About The Estimate
  - –Provide Requested Data
  - –Write Down Assumptions
  - –Provide Basis of Estimate
  - –Show Calculations
  - –Be Consistent and Traceable
- Adequate Funding Reserves
  - –Bottoms-Up Allocations, Based On Risk
  - –Project Phase Specific
- Adequate Schedule Reserves
  - –Along Critical Path
  - –Funded (“marching army”)
- Tracking And Control (Earned Value…)



ESSP AO-3 Funding Schedule
(Planning Purposes Only)

Mission	Activity	Dates	Fiscal Year	Max Funds
ESSP-5	Formulation	08/02 - 09/03	FY02	$0.2M
			FY03	$18M
	Implementation/ Operations	10/03 - 09/08	FY04	$33M
			FY05	$37M
			FY06	$27M
			FY07	$6M
			FY08	$4M
ESSP-6	Risk Reduction	08/02 - 04/03	FY02	$0.2M
			FY03	$1.4M
	Formulation	05/03 - 04/04	FY03	$7M
			FY04	$9M
	Implementation/ Operations	05/04 - 09/08	FY04	$11M
			FY05	$38M
			FY06	$34M
			FY07	$14M
			FY08	$10M